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Mapping of Environmental Health Risk to Support Healthy City in the Coastal Area of Bulukumba

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Abstract

Coastal areas have a number of environmental health problems such as the availability of clean water, garbage, toilet and sewerage. An environmental-based decision-making approaches is Environmental Health Risk Assessment (EHRA) approach that oriented to spatial so that right on target. This research aimed to map the status of environmental health risks in the coastal area of Salemba village, Bulukumba district. The type of research is observation with descriptive approach. It was conducted on 3 hamlets in Salemba village. We collect samples as many as 185 houses. Sampling was done by non-random sample with accidental sampling method. The results indicated that the most water source consumed by households was gallon water equal to 46.5%. A total of 51 houses or 27.6% do not meet the physical requirements of clean water. A total of 24.3% of households still choose gardens, ditches, and rivers/beaches/seas for defecation. A total of 155 households or 83.8% have no trash can. A total of 185 households or 100% have no sewerage so that waste water flows into the yard, canals and drains. The result of Environmental Health Risk Assessment (EHRA) in Salemba village shows that 2 hamlets in less risky category and 1 in very-high risk category.

Keywords: Coastal areas; Mapping; EHRA.

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1. Introduction

According to Hendrik L. Blum that main factors affecting the health of individuals and communities are environment, behavior, in addition to health care and offspring. Many aspects of human well-being are influenced by the environment, and many diseases can be initiated, supported or stimulated by environmental factors. Environment and behavior have a mutualistic-symbiotic relationship within a community.

The problems of environmental-based health are caused by poor environmental conditions both in quality and quantity as well as low public health behavior. In addition, such environment-based diseases may also arise due to not eligible basic sanitation, sanitation of public places and non-sanitary food processing [1]. A highlight of environmental health problems is the coastal area. According to Suning and Soedjono showed that coastal villagers have a habit of mistakenly defecation in the sea, ponds and rivers [2].

The behavior of mistakenly defecation is not only influenced by the lack of adequate toilet, sufficient clean water and good economic conditions, but it is also dominantly affected by the behavior of communities that not usual to use toilet by impractical reason and must provide enough water to use it. Bulukumba district is one of the cities that implementing healthy cities in Indonesia. One focus of the program is improving public health by improving environmental sanitation in areas with risks.

A poor environmental health risky village lies in the coastal area of Ujungloe subdistrict. Poor access conditions, sanitation, behavior, and not yet ODF (open defecation free) become an additional burden for Salemba villagers to live healthier. The research aimed to map the status of Environmental Health Risk Assessment (EHRA) in coastal areas of Salemba village, Bulukumba district.

2. Method of Research

The type of research was observation with descriptive research. It was conducted since 10 June– 21 September 2017 in Salemba village, Ujungloe subdistrict, Bulukumba district. The population of research was households in 3 hamlets that are Kapasa, Lembang, and Polewali. Samples taken are as many as 185 houses.

The sampling was done by non-random sampling with accidental sampling method. In this research, there are 2 (two) types of data used are primary and secondary data. The tool used in this primary data collection is Android (ODK) for GPS data, questionnaires, observation sheets (checklist), documentation. Spatial data is processed with Arc Gis 10.3 software.

3. Result

Salemba village is one of 13 villages in Ujungloe Subdistrict. Salemba consists of 3 (three) hamlets that are Kapuas, Lembang and Polewasi with total area of 4.43 km2 and coastal geographic location is less than 500 m above sea level and coastal length is 13 km.

The population in 2016 is 3.331 populations consisting of 1.574 male and 1.757 female. The number of health

service includes Integrated Service Post is 3 and Village Health Post is 1. Environmental Health Risk Index is the determination of risk for each hazard source variables and hazard exposure opportunities as well as its components and then made percent per hamlet.

The calculation result of each hazard source variables and hazard exposure opportunities were obtained through the number of hazard (n) is divided by the number of respondent and multiplied by 100.

The environmental health risks index that will be presented in this research include water source, domestic waste water, garbage, as well as clean and healthy life behavior that is the habit of not washing hands with soap. The percentage of Environmental Health Risk Index in Salemba village, Ujungloe subdistrict, Bulukumba district is presented in the following table 1.

Table 1: The Risk of Environmental Health in Salemba Village, Ujung Loe Subdistrict, Bulukumba District

Variable	Answer	Village					
		Kapasa		Lembang		Polewali	
		n	%	n	%	n	%
Water Sources							
Surface water sources	Yes	19	45,2	12	19,7	27	32,9
The distance the source of pollution <10 m	Yes	23	54,8	35	57,4	47	57,3
Physical qualities of water	No	8	19,0	32	52,5	11	13,4
Waste Water Domestic							
Do not have a privy	Yes	12	28,6	28	45,9	23	28,0
Household wastes distributed to the countyard	Yes	18	42,9	34	55,7	42	51,2
Trash							
Not having the trash	Yes	29	69,0	59	96,7	67	81,7
PHBS							
Do Not CTPS	Yes	32	76,2	44	72,1	50	61,0

Post-weighting of each component in the variable then calculated by dividing the percentage value of environmental health risk by 100% then multiplied by the weight of each component that has been predetermined. Then, the calculation results are calculated based on the hamlet. The weighting is described in more detail in the following table 2.

The cumulative of Environmental Health Risk Index is the merging or the summation of environmental health risk index with the result of weighting. The following of cumulative environmental health risk index table 3. Area with very high risk for environmental health is Lembang hamlet as a most vulnerable area of various

environmental diseases or other health disorder.

Based on data, we know that 54.9% household do not use toilet and waste water that is allowed to flow into the yard/soil, while areas with less risky environmental health is Kapasa and Polewali. Households in the area most use clean water sources as well as toilet for defecation.

Table 2: Environmental health risk index calculations in Salemba Village, Ujung Loe Subdistrict, Bulukumba District

Variabel	Weight	Village		
		Kapasa	Lembang	Polewali
Water Sources		**39**	**43**	**33**
Surface water sources	35%	16	7	11
The Distance the source of pollution <10 m	30%	16	17	17
Physical qualities clean water	35%	7	19	5
Waste Water Domestic		**35**	**51**	**40**
Do not have a privy	50%	14	23	14
Household wastes distributed to the countyard	50%	21	28	26
Trash		**69**	**97**	**82**
Not having the trash	100%	69	97	82
PHBS		**76**	**72**	**61**
Do Not CTPS	100%	76	72	61

Table 3: Cumulative Environmental Health Risk Index in Salemba Village, Ujung Loe Subdistrict, Bulukumba District

Village	Variable				Total
	Water Sources	Waste Water Domestic	Trash	PHBS	
Kapasa	39	35	69	76	219
Lembang	43	51	97	72	263
Polewali	33	40	72	61	216

Based on above table 3, it can be obtained the total of summation of hazard source and hazard exposure opportunities in each hamlet.

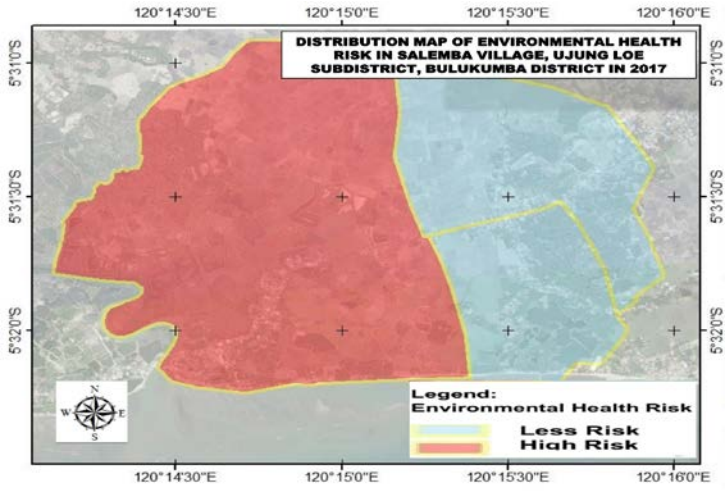

Figure 1: Map Environmental Health Risk

4. Discussions

Based on the result of research, there are 3 (three) main sources of clean water used by household for daily activities. The largest source of water used by households is gallon water equal to 46.5%. The use of other clean water sources is unprotected well water by 29.7%. The number of households using drilling well water is 11.9%. Similar results were found in Barito Kuala district with the number of users of gallons reaching 40% from 114 families [3].

For the distance of clean water sources with pollutants, the use of well water by households with distances from pollutants is less than 10 meters in 3 (three) hamlets by 56.8%, whereas for water use by households with distances from pollutants is more than 10 meters by 37.3% for using wells inside the house. Similarly, in a study in Banjar district found that as many as 46 (56.1%) of respondents have water sources less than 10 meters [4].

The results of research showed that 51 houses or 27.6% do not meet the physical requirements of clean water, and 105 houses or 56.8% do meet the physical requirements of clean water that is colorless, tasteless, and odorless. This is similar to the result of Rante [5] in Rappocini subdistrict, Makassar that the physical quality of water owned by households is largely do not meet the requirements. Smelled water becomes an indicator of metabolic activity of microorganisms in the form of pathogenic bacteria. The presence of pathogenic bacteria in water can occur through seepage of pollutant sources such as septic tanks.

Drinking water is either consumed or unprocessed water meets health requirements. Meanwhile, the results of interviews with respondents obtained information that the most widely used drinking water source is unprotected well water. Wells water is first boiled by respondents before consumed by family members or about 53%, the rest of 40.6% of respondents who choose to use refill water as drinking water, and 5.4% of respondents chose not to treat drinking water first before consumption. The boiled water is then stored in a container, as well as gallons and a bucket with a lid.

As many as 122 households or 65.9% have toilet and 63 households or 34.1% not have toilet, 3 (1.6%) still

choose garden/yard for defecation, 8 (8.3%) choose ditches for defecation, and as many as 34 (18.4%) are still defecating in rivers/beach/ sea. A research conducted by Azwinsyah [6] in Sei Musam village showed different result with majority of 46 (52.9%) respondents did not have toilet. The total of septic tanks ownership for fecal conduits is 116 respondents or 95.1%, cubluk 3 (2.5%) respondents and 3 respondents (2.5%) flow to river/lake/beach/sea.

The numbers of households who have garbage can are 30 or 16.2%, it is less than those who do not have household garbage facilities, which is 155 households or 83.8%. Based on the handling of garbage, as many as 148 households or 80% tend to burn, while others are discharged into the sea by 12 households or 6.5% and discharged into holes by 4 households or 2.2%. This research is in line with the research in 4 villages in Sukoharjo district where the availability of garbage facilities are only 37.58% with a sample of 1.254 household [7]. The results of research indicate that as many as 185 households or 100% do not have sewegare so that wastewater flows to the yard, canal, ditch, or outdoor container. Households that flow their wastewater to the yard are as many as 94 or 50.8%, ditch by 26 or 14.1%, as well as outdoor container by 3 or 1.6%. Similar results were also found in Imroatus [8] studies in the coastal areas of Kairatu village showing the low ownership of sewerage in every house. Of 123 respondents is only 15 (12.2%) had sewerage and 108 (87.8%) did not have.

Based on the result of research indicate that majority of peoples at 3 hamlet in Salemba village, Bulukumba district have not a habit to do hand-washing using soap is 126 respondents or 68.1% have not a habit to do hand-washing using soap, while 59 responden or 31.9% have a habit to do hand-washing using soap at 5 important times i.e before eating, before preparing food, before feeding the child, after clean infant/child buttock, and after loosen the bowel. It is associated with a research conducted by Jelantik [9] found only 31 (38.75%) housewives who have a habit to do hand-washing using soap and 49 (61.25%) did not have the habit.

5. Conclusion

The result of Environmental Health Risk Assessment (EHRA) analysis in Salemba village indicates that Kapasa and Polewali are in less risk category while Lembang is in very high risk category.

6. Recommendation

To encourage the acceleration of healthy village development in Salemba to Salemba villagers to be more active in channeling their aspirations and participating in activities that have been agreed so that they can realize clean, comfortable, safe and healthy areas to live in.

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